DIRECTORATE GENERAL OF SHIPPING		
Ref: QMS: EACQP-07-1	Examination, Assessment & Certification (EAC Branch)	IS/ISO Clause No. 7.1
Page No. 1 of 2	Subject: Conduct of Marine Boiler & Steam Engineering Course - Operational Level and Management Level- Guidelines	File No: ENG/STCW-52(2)/2011-I
Approved by: CS/DG	Circular No: Training Circular No. 18 of 2013	Date: 06.09.2013

The Directorate has issued the Training Circular No. 16 of 2013 dated 25.07.2013 with respect to the conduct of Marine Boiler & Steam Engineering courses in both operational as well as in the management level, which also included the processing fees for the course(s) and the specification of the Boiler to demonstrate such training course(s).

2. This training circular pertains to the guidelines for the above referred operational and management level course(s) and describes the course syllabus in detail.

3. The guidelines were developed after holding a number of discussions with the reputed maritime institutes so as to benefit the seafarers who do not have the experience of sea service on boilers while sailing on ships. The training module has been structured keeping in view the requirement of above type of candidates.

4. In this context, the Directorate has decided that those candidates who do not have commensurate qualifying sea service on boilers while sailing on ships, may either opt for a Certificate of Competency with the limitation 'not valid for service on vessels with boilers' or may undertake a suitable training which may include Simulator Training on boilers, as specified in the para 7 of the section A-III/1 of Chapter III of the STCW code, in an approved maritime training institute, in order to acquire the requisite qualifying sea service for the above mentioned CoC.

5. Those institutes intending to conduct this course, after installing a proper boiler to demonstrate training, may develop the course(s) and submit the proposal(s) to the Directorate for approval. Informatively, a proper boiler is one which was used onboard ships and was build not earlier than 1980.

6. The details with respect to the Marine Boiler & Steam Engineering Course-Operational Level, including the syllabus is attached as Annexure-I.

7. Similarly, the details with respect to the Marine Boiler & Steam Engineering Course- Management Level, including the syllabus is attached as Annexure-II.

DIRECTORATE GENERAL OF SHIPPING		
Ref: QMS: EACQP-07-1	Examination, Assessment & Certification (EAC Branch)	IS/ISO Clause No. 7.1
Page No. 1 of 2	Subject: Conduct of Marine Boiler & Steam Engineering Course - Operational Level and Management Level- Guidelines	File No: ENG/STCW-52(2)/2011-I
Approved by: CS/DG	Circular No: Training Circular No. 18 of 2013	Date: 06.09.2013

8. This issues with the approval of Director General of Shipping & ex officio Additional Secretary to the Government of India.

[A. B. Dutta]
Engineer & Ship Surveyor-Cum-DDG (Tech)

To,

1. All Maritime Training Institutes
2. Vice Chancellor, Indian Maritime University, East Coast Road, Uthandi, Chennai- 600119.
3. All Academic Councils.
4. All Mercantile Marine Departments
5. The Shipping Master, Mumbai/ Kolkata/ Chennai
6. The Director, Seamen's Employment Office, Mumbai/ Chennai/ Kolkata
7. INSA/ FOSMA/ MASSA
8. INDOS Cell, Nav Bhavan Building, Mumbai- 400001
9. Engineering Branch
10. Nautical Branch
11. Naval Architecture Branch
12. Management Representative [QMS], EAC Branch, DGS
13. Crew Branch
14. Computer Cells
15. Hindi Cell

Encl.: Annexure-I and Annexure-II

Annexure-I

MARINE BOILER AND STEAM ENGINEERING COURSE-OPERATIONAL LEVEL

COURSE guidelines

Course Title :MARINE BOILERS & STEAM ENGINEERING.
Level: Operational.
Theory : 20hrs
Practicals: 21hrs
Faculty In-charge:

---

a) Name, Address & Telephone No. of :

Head of Institute and Course In-charge

b) List of Instructors and Name & :

telephone No. of Warden

(c) Guidelines for Instructors :

1. All the Instructors to adhere the timing as mentioned in time table.
2. All the instructors should prepare the lesson plans, course materials and presentation as mentioned in this guidelinesl.
3. All the instructors should evaluate the trainee at the end of the course.

(d) Course Objectives; At the end of the course, the cadets will be able to

- Describe the classification societies requirements for boiler construction
- Differentiate between application & operating principal of smoke tube and water tube boilers List types of smoke tube and water tube boilers and describe Features and operating principals
- Describe function of boiler mountings
- Describe operating principal and features of steam plant associated equipment and systems.
- Describe the operations and operating procedure of Marine auxiliary Boilers
- Describe Boiler maintenance requirement and list out the procedure

(e) **Scope of the Course:** The scope includes the following: Design considerations, classification society requirements of steam equipment in general, specific Marine Auxiliary boilers equipment used on merchant vessels. Types of boilers and boiler mountings. Study in details Auxiliary boilers (Sunrod element, water tube, AO9 mission OL, Composite Boiler) Starting, stopping, operation of auxiliary Boilers and turbines. Boiler water testing and treatment.

(f) Reference Books (a) Text Books Marine boilers 3ed , by GTH Flanagan (b) Marine Steam Boilers BY J H Milton (c) Boiler Operators Guide by A L Kohan, (d) Reed's Series Vol 8 and 9 (e) Marine Engineering By Harrington (F) Running and Maintenance of Marine Machinery By Dr J Cowley

(g) Course Plan:

Sr .No.	Topic	Book	Faculty's Name.	No.of Lects.	Practicals
1	General principles of steam generator. General considerations of design			2	3
2	Smoke tube boilers			2	-
3	Water tube boilers			2	3
4	Waste heat boilers			2	-
5	Boiler Mountings			4	4
6	Combustion system and safeties			2	3
7	Boiler water treatment			3	3
8	Operation care & Maintenance			2	2
9	Boiler System			-	3
10	Assessment and Review			1	-
	Total			**20**	**21**

Each session will be followed up by a question answer exercise on the day's topic.

(h) Procedure for Evaluation, Criteria for Passing and Instructions for Re sits: Written & oral examination by Institution. 70% is the pass marks. Failed students will be given additional classes and re exam will be conducted

(i) Re-Examination : Written and Orals

MARINE BOILER AND STEAM ENGINEERING COURSE-OPERATIONAL LEVEL

SYLLABUS

MARINE BOILER AND STEAM ENGINEERING COURSE-OPERATIONAL LEVEL

SYLLABUS

Main Topic	General Learning Objectives (Duration) (Training Aids)	Specific Learning Objectives	Remarks Competency
1.General considerations Governing the design of Boilers 5.0/41	A. Student learns about development of Steam Machinery & design considerations (2+3 Hr)	1.1 Understand the types of Modern day steam plants & machinery 1.2 State marine applications of Boilers & Turbines(30) 1.3 State stresses in boiler shell (15) 1.4 Understand the working conditions of boiler pressure and effect of temperature on yield strength (15) 1.5 Describe the classification. society requirements for calculation of minimum thickness selection of materials, working temperature, design pressure. (30) 1.6 Understand the requirement of auxiliary boiler onboard.(30) 1.7 Familiarization of boiler System-PRACTICALS(180)	Table A-III/1 Marine Engineering at the operational Level Operate main And Auxiliary Machinery and Associated control systems-Marine Boiler
2.Smoke tube boilers 7.0/41	A. student learns about Smoke tube boilers & auxiliary boilers, components and systems(2 Hrs)	2.1 Describe general arrangement, flow of hot gases 2.2 Describe vertical smoke tube boiler 2.3 Describe Aalborg Mission OM Boilers 2.4 State the requirements of steam to steam generator 2.5 Describe composite boiler Aalborg OC type..	-Do-
3.Water tube Boilers 12.0/48	A. Student learns about features, general arrangement of water tube boilers its advantages (2+3 Hrs)	3.6 Audi visual Presentation on types of Boilers-PRACTICALS Self Learning tool	-Do-

4.Waste heat boilers	A.Student learns about Waste heat recovery boiler, Economizers (02 Hrs)	4.1 Describe the design considerations for waste heat recovery 4.2 Describe types of waste heat recovery boilers 4.3 Explain operation methods of boiler and economizer under way 4.4 Explain precautions for using exhaust gas economizer 4.5 Explain why the temperature of boiler exhaust gases should be maintained above a minimum value 4.6 Explain with the help of line diagram the arrangement on board for an oil fired boiler working in conjunction with exhaust gas recovery boiler / economizer	
5.Boiler Mountings	A.Student learns about Boiler Mountings and their functions (04+04 Hrs)	5.1 State the various mountings fitted on boilers and their basic function -identify the following boiler fitting and position on boiler shell (supply shell diagram for fitting to be married/ drawn and identified): -main stream outlet (or stop) valve -safety valves and easing gear -water level gauge -feed inlet valve -blow-down valve -scrumming valve -soot blower -connection for pressure gauge -air release valve -sampling valve Explain the importance of boiler mounting valves 5.2 Describe Classification society rules for Safety valves selection, set pressure, accumulation test 5.3 Describe constructional features of high lift and full bore safety vv-State the function of safety valve and how to adjust the setting point to blow Safety valves (7.02 1.3.1.14) 2Hrs	

		Analyze operational problems that can occur with safety valves Examine how a safety valve is inspected and overhauled, giving common defects and areas Of importance when inspecting. Formulate a procedure for setting safety valves and examine the precautions necessary when testing safety valves on boilers and waste heat units 5.4 Describe constructional features of water level indicators. -Describe the method used to ensure that all pipes, cocks, valves and other fittings used for indicating water level are clear and in good working order -Describe the correct procedure for checking the water level in steaming boiler.	
		5.5 Describe class requirement of Feed regulator, circulating valve, blow down valve, air vents, low water level sensor and alarm/trip. 5.6 identify the following internal boiler fitting and internal position within boiler shell: - feed water distribution unit - summing pan - blow down dip pipe 5.7 Explain the purpose of a reducing valves and fittings listed in the above objective, compare the difference where applicable between water tube and fire tube boiler 5.8 Explain the purpose of a reducing valve 5.9 Describe the operation of a reducing valve, using a single line	

		sketch 5.10 Explain how steam pipes are supported 5.11 Explain how expansion and contraction are allowed for in steam pipes 5.12 Describe the purpose of drains and steam traps 5.13 Describe the operation of steam traps	
6 Combustion System and safeties 27/41	Student learns about firing the boiler (2+3hrs)	6.1 Describe the fuel system and associated components. State the range of percentages of CO2 which indicate: - good combustion - poor combustion - bad combustion Reference to be made of the relevance of stochiometric combustion for tanked operation. Describe furnace condition which indicate food combustion Explain the importance of atmosphere when it is required to mix a liquid fuel with air prior to combustion Explain why the viscosity of a fuel is important in its atomization Describe how the viscosity of a liquid fuel can be controlled by varying its temperature State the theoretical air/fuel ratio for a typical boiler fuel State the actual air/fuel ratio allowing for normal excess air in the furnace of steam boiler Describe with a single line	-Do-

		diagram, a combustion air register, identify - Swirl vanes - The quarl - the flame stabilizer - Air flow control valve - The burner 6.2 Describe types of burners (Y jet, spinning cup, steam assisted atomizers) Sketch a section through the nozzle assembly of a pressure-jet burner State that the above objective atomization is produced by the fuel, at high pressure passing through a small orifice in the burner nozzle Describe with the aid of sketches how pressure jet, steam jet and rotary cup burner atomize fuel and promote adequate fuel/air mix ratio. Describe the attention required by burner atomizer tip 6.3 explain ignition system inclosing the function of burner control state what is meant by ABC and ACC Describe the principles of construction, operation and control of a package boiler – PRACTICALS	

8 Operation & maintenance of boilers 37/41	A. Student learns about operation of boilers (02+02 hrs)	8.1 Describe the procedure for preparing auxiliary boilers for flashing up - State how to build up the steam pressure and to put boiler into service -Explain precautions and necessary measures to be taken when getting up steam 784 Describe the procedure for warming through a steam line and explain the causes in simple terms of water hammer and how water hammer can be avoided Explain what malfunction / trouble is likely to happen to boiler in operation 8.5 Describe the procedure of plugging of tubes and renewal. 8.6 Explain the need for and the use of soot blowers - understand requirement soot blowing. - Describe types of soot blowers and their function - State what is meant by soot blow including the function of soot blowers	
9 Boiler systems 40/41	Students learns to simulate boiler operation 3 hrs	Simulator	
10 41/41	Assessment & review 1hrs		

Emblem

name ...

Certificate No:

THIS IS TO CERTIFY THAT MR. .....

Date of Birth: ...../...../.....
Holder of C.D.C. No. ..... and Passport No. .....
Certificate of Competency, Grade ..... No. .....
Indian National Data base (INDos No.).....
has successfully completed a training course

MARINE BOILER AND STEAM ENGINEERING COURSE-OPERATIONAL LEVEL

held from ..... to .....and has been found qualified.

The course is approved by the Directorate General of Shipping and meets the requirements laid down in: Table A-III/I (Operational Level) of STCW Convention as amended in 2010.
The Candidate has also met the additional criteria specified in the STCW Convention, applicable to the issue of the certificate.
This certificate is issued under the authority of the Directorate General of Shipping, Ministry of Shipping, Govt. of India.

Signature of Candidate
(Name & Signature)

Course Officer
(Name & Signature)

Date of Issue:
Date of Expiry: UNLIMITED

Institution Seal

Hologram

Principal

Annexure-II

MARINE BOILER AND STEAM ENGINEERING COURSE-MANAGEMENT LEVEL

COURSE guidelines

Course handout

Course Title :MARINE BOILERS & STEAM ENGINEERING.
Level: Management.
Theory : 38hrs
Practicals: 24hrs
Faculty In-charge:

---

a) Name, Address & Telephone No. of :

b) List of Instructors and Name & :

telephone No. of Warden

(c) Guidelines for Instructors:

1. All the Instructors to adhere the timing as mentioned in time table.
2. All the instructors should prepare the lesson plans, course materials and presentation as mentioned in this manual.
3. All the instructors should evaluate the trainee at the end of the course.

(d) Course Objectives; At the end of the course, the cadets will be able to

- Describe the classification societies requirements for boiler construction
- Differentiate between application & operating principal of smoke tube and water tube boilers List types of smoke tube and water tube boilers and describe Features and operating principals
- Describe function of boiler mountings
- Describe operating principal and features of steam plant associated equipment and systems.
- Describe the operations and operating procedure of Marine auxiliary Boilers
- Describe Boiler maintenance requirement and list out the procedure

(e) Scope of the Course: The scope includes the following: Design considerations, classification society requirements of steam equipment in general, specific Marine Auxiliary boilers equipment used on merchant vessels. Types of boilers and boiler mountings. Study in details Auxiliary boilers, Starting, stopping, operation of auxiliary Boilers and turbines. Boiler water testing and treatment.

(f) Reference Books (a) Text Books Marine boilers 3ed , by GTH Flanagan (b) Marine Steam Boilers BY J H Milton (c) Boiler Operators Guide by A L Kohan, (d) Reed's Series Vol 8 and 9 (e) Marine Engineering By Harrington (F) Running and Maintenance of Marine Machinery By Dr J Cowley

(g) Course Plan:

S.No	Topic	Book	Faculty Name	No. of Lects.	Practicals
1	General principles of steam generator. General consideration of design			6	3
2	Smoke tube boilers			2	-
3	Water Tube boilers with superheaters			4	3
4	Waste heat boilers			2	-
5	Boiler Mountings			4	4
6	Boiler auto control system, burner management system, SCC			6	3
7	Boiler water treatment			5	3
8	Operation care & Maintenance			4	2
9	Boiler System			-	5
10	Auxiliary Steam Turbine – Operation			3	1
11	Assessment and Review			3	1
12	Total			38	24

Each session will be followed up by a question answer exercise on the day's topic.

(h) Procedure for Evaluation, Criteria for Passing and Instructions for Re sits: Written & oral examination by Institution. 70% is the pass marks. Failed students will be given additional classes and re exam will be conducted

(i) Re-Examination : Written and Orals

MARINE BOILER AND STEAM ENGINEERING COURSE-MANAGEMENT LEVEL

SYLLABUS

S.No	Topic	Book	Faculty Name	No. of Lects.	Practicals
1	General principles of steam generator. General consideration of design			6	3
2	Smoke tube boilers			2	-
3	Water Tube boilers with super heaters			4	3
4	Waste heat boilers			2	-
5	Boiler Mountings			4	4
6	Boiler auto control system, burner management system, SCC			6	3
7	Boiler water treatment			5	3
8	Operation care & Maintenance			4	2
9	Boiler System			-	5
10	Auxiliary Steam Turbine – Operation			3	1
11	Assessment and Review			3	1
12	Total			38	24

1.General considerations Governing the design of Boilers 9/62	A. Student learns about development of Steam Machinery & design considerations (6+3 Hr)	1.1 Understand the types of Modern day steam plants & machinery 1.2 State marine applications Boilers & turbines (30) 1.3 State stresses in boiler shell (15) 1.4 Understand the working conditions of boiler pressure parts and effect of temperature on yield strength (15) 1.5 Describe the classification society requirements for calculation of minimum thickness selection of material, working temperature, design pressure. (30) 1.6 Understand the requirement of auxiliary boiler onboard. (30) 1.7 Familiarization of Boiler System – PRACTICALS (180) 1.8 Name the various heating loads on ship and required temperatures to maintain them. 1.9 Average working pressure of Saturated steam boiler 2.0 Steam line layout and steam traps. 2.1 Human injury and safety to be adopted.	Table A-III / 2 Marine Engineering at the Management Level Operate main and Auxiliary machinery and associated control systems Marine Boiler
2. Smoke tube boilers	A. Student learns about smoke tube boilers & auxiliary boilers, Components and systems (2Hrs)	2.1 Describe general arrangement, flow of hot gases 2.2 Describe vertical smoke tube boiler 2.3 Describe Aalborg Mission OM boilers. 2.4 State the requirements of steam to steam generator 2.5 Describe composite boiler Aalborg OC type.	-DO-
3. Water tube boilers 18/62	A. Student learns about features, general arrangement of water tube boilers its advantages (4+3 Hrs)	Boiler and associated auxiliaries and steam systems 7.04 1.4.3.2 (16 Hrs) 3.1 Describe the basic arrangement of a D type water tube boiler and the salient features of D type boilers Explain Natural circulation within boiler 3.2 Describe the functions of major components, types of tubes and functions (steam drum, water drum, header, Steam drum internal) 3.3 Describe the types of tubes and functions (Screen, water wall, generating, super heater, down comer, riser) 3.4 Describe salient features of Aalborg water tube boilers – 3.5 Explain the outline of steam supply system including its components / installation 3.6 Audio visual Presentation on types of Boilers – PRACTICALS – Self	-DO-

		Learning tool 3.7 Detailed constructional features of boiler and accessories like attemperator etc with relevance to design importance and consequences thereof in case of failure	
4. Waste heat boilers	A. Student learns about Waste heat recovery boiler, economizers (02 Hrs)	4.1 Describe the design considerations for waste heat recovery 4.2 Describe types of waste heat recovery boilers 4.3 Explain operation methods of boiler and economizer under way 4.4 Explain precautions for using exhaust gas economizer 4.5 Explain why the temperature of boiler exhaust gases should be maintained above a minimum value 4.6 Explain with the help of line diagram the arrangement on board for an oil fired boiler working in conjunction with exhaust gas recovery boiler / economizer	-Do-
5. Boiler Mountings 28/62	A.Student learns about Boiler Mountings and their functions (04+04Hrs)	5.1 State the various mountings fitted on boilers and their basic function - Identify the following boiler fittings and position on boiler shell (supply shell diagram for fitting to be married / drawn and identified): - Main steam outlet (or stop) valve - Auxiliary steam stop valve - Safety valves and easing gear - Water level gauge - Feed inlet valve - Scumming Valve - Soot blower - Connection for pressure gauge - Air release valve - Sampling valve Explain the importance of boiler mounting valves 5.2 Describe Classification society rules for Safety valves selection, set pressure, accumulation test 5.3 Describe constructional features of high lift and full bore safety vv -State the function of safety valve and how to adjust the setting point to blow Safety valves (7.02 1.3.1.14) 2 Hrs Analyze operational problems that can occur with safety valves Examine how a safety valve is inspected and overhauled, giving common defects and areas of importance when inspecting. Formulate a procedure for setting safety valves,	-Do-

		and examine the precautions necessary when testing safety valves on boilers and waste heat units 5.4 Describe constructional features of water level indicators - Describe the method used to ensure that all pipes, cooks, valves, and other fittings used for indicating water level are clear and in good working order - Describe the correct procedure for checking the water level in steaming boiler. 5.5 Describe class requirement of feed regulator, circulating valve, blow Down Valve, air vents, lows water level sensor and alarm/trip 5.6 identify the following internal boiler fitting and internal position within Boiler Shell: -Feed water distribution unit -Summing Pan -Blow down dip pipe 5.7 Explain the purpose of the valves and fitting listed in the above objective, compare the difference where applicable between water tube and fire tube boiler 5.8 Explain the purpose of a reducing valve 5.9 Describe the operation of a reducing valve, using a single line sketch 5.10 explain how steam pipes are supported 5.11 explain hoe expansion and contraction are allowed for in steam pipes 5.12 Describe the purpose of drains and steam traps 5.13 Describe the operation of steam traps	

6 Boiler Auto control systems 37/62	Student learns about firing the boiler (6+3hrs)	6.1 Describe the fuel systems and associated components. State the range of percentage of CO_2 which indicate: -Good Combustion -Poor Combustion -bad Combustion Describe furnace condition which indicate good combustion explain the importance of atomization when it is required to mix a liquid fuel with air prior to combustion Explain why the viscosity of a fuel is importance in its atomization Describe how the viscosity of a liquid fuel can be controlled by varying its temperature State the theoretical air/fuel ratio for a typical boiler fuel with reference to tanker operation State the actual air/fuel ratio, allowing for normal excess air in the furnace of a steam boiler Describe with a single line diagram, a combustion air register, identify -Swirl vanes -The Quarl -The Flame stabilizer -Air flow Control Valve -The Burner 6.2 Describe types of burners (Y jet, spinning cup, stem assisted atomizers.) Sketch a section through the nozzle assembly of a pressure – jet burner State that the above objective atomization is produced by the fuel, at high pressure passing through a small orifice in the burner nozzle Describe with the aid of sketches hoe pressure jet, steam, jet and rotary cup burner atomize fuel and promote adequate fuel/air mix ratio. Describe the attention required by burner atomizer tip 6.3 Explain ignition systems including the function of burner Control State what is meant by ABC and ACC 6.4 Boiler automation with respect to SCC, BMS and water level Describe the principles of construction, operation and control of a package boiler - PRACTICALS	

7.Boiler water treatment 45/62	A. Student learns about scale formation, corrosion and requirements of water treatment (05+03hrs)	7.1 Describe the constitutes of sea water and type of salts 7.2 explain the need for removal of hardness salts 7.3 Understand types of corrosion and effect of quality of boiler water on boiler (dependence on pH, alkalinity and Oxygen content) 7.4 Describe the terms Blow down, dosing, sampling, carryover, priming, Caustic Embrittlement. 7.5 Explain the importance of boiler water treatment. Explain the treatment of boiler water including examination of properties of boiler water including surface and bottom blow of boiler life 7.6 Explain the effect of quality of boiler water on boiler life 7.7 State Procedure for determination of (a) Chloride content (b) Alkalinity (c) Phosphate Understand requirement of blow down, dosing, sampling and meaning of priming carryover Describe the danger of oil entering with the feed water Describe the means used to minimize the possibility of oil contaminating the boiler feed water	
8 operation & maintenance of boilers 51/62	A. Student learns about operation of boilers (04+02hrs)	8.1 Describe the procedure of (a) Pressure testing (b) Laying up and explain how to keep boiler in cold condition while it is out of service (c) Inspection 8.2 Describe the procedure for preparing auxiliary boilers for flashing up 8.3 Describe the procedure of raising steam from cold and safety precautions State procedure for igniting the burner manually and automatically	

		-Explain what is meant by 'blow-back' -Explain how blow back can be avoided -State hoe to build up the steam pressure and to put boiler in to service -Explain precautions and necessary measures to be taken when getting up steam -Explain the benchmark for building up stem pressure 8.4 Describe the procedure for warming through a steam line and explain the causes in simple terms of water hammer and how water hammer can be a avoided -Describe the correct procedure for operating steaming boiler in parallel on load -State precautions for opening high temperature steam valves -Explain what malfunction/trouble is likely to happen to boiler in operation 8.5 describe the procedure of plugging of tubes and renewal	
9 Boiler Systems 56/62	Students Learns to Simulate boiler operation 5hrs	Simulator	
10 Auxiliary Steam Turbine 60/62	Student Understands the basic turbine and its starting (3hrs+1hrs)	10.1 Understands a steam turbine 10.2 Understands the features of a steam turbine plant 10.3 Understands the sequence of events in starting a turbine from cold	
11 62/62	Assessment & review 2hrs		

Certificate No:

THIS IS TO CERTIFY THAT MR. .....

Date of Birth: ...../...../.....
Holder of C.D.C. No. ..... and Passport No. .....
Certificate of Competency, Grade ..... No. ....
Indian National Data base (IN Dos No.).....
has successfully completed a training course

MARINE BOILER AND STEAM ENGINEERING COURSE-MANAGEMENT LEVEL

held from ..... to .....and has been found qualified.

The course is approved by the Directorate General of Shipping and meets the requirements laid down in: Table A-III/I (Management Level) of STCW Convention as amended in 2010.
The Candidate has also met the additional criteria specified in the STCW Convention, applicable to the issue of the certificate.
This certificate is issued under the authority of the Directorate General of Shipping, Ministry of Shipping, Govt. of India.

Signature of Candidate
(Name & Signature)

Course Officer
(Name & Signature)

Date of Issue:
Date of Expiry: UNLIMITED

Institution Seal

Hologram

Principal